

Los Alamos National Laboratory  
Environmental Restoration Program  
Standard Operating Procedure

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Field Quality Control Samples

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## Field Quality Control Samples

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## **Field Quality Control Samples**

### **1.0 PURPOSE**

This procedure provides instructions for the collection of field quality control (QC) samples to ensure the reliability and validity of field and laboratory data.

### **2.0 SCOPE**

#### **2.1 Applicability**

This procedure is applicable to all Environmental Restoration (ER) Program activities involving the collection of field QC samples.

#### **2.2 Training**

The Field Team Leader (FTL) is responsible for monitoring the proper implementation of this procedure and must ensure that field team members collecting QC samples are trained on each sampling procedure to be used. Additionally, the FTL and field team members must document that they have read and understood this procedure and the other procedures in Section 1.0, General Instructions.

### **3.0 DEFINITIONS**

- A. Aliquot: A sample aliquot is a portion of a sample that is representative of the entire sample.
- B. Background Sample: A sample collected from an area or site similar to the one being studied, but located in an area known or thought to be free from pollutants of concern.
- C. Equipment (Rinsate) Blank: Usually organic-free water that is as free of analyte as possible and is transported to the site, opened in the field, and poured over or through the sample collection device, collected in a sample container, and returned to the laboratory.
- D. Field Blank: Usually organic-free water solution that is transferred from one container to another at the sampling site and preserved with the appropriate reagents.
- E. Field Duplicate (Replicate) Samples: Two separate, independent samples taken from the same source that are collected in such a manner that they are co-located samples, equally representative of the sample matrix at a given location and time.

- F. Quality Control Samples: Samples used in a planned check of the operation of a measurement system to obtain a measure of the quality of the data generated.
- G. Reagent Blank: Usually an organic-free aqueous solution that is as free of analyte as possible and contains all the reagents in the same volume as used in the processing of the samples. A reagent blank must be carried through the complete sample preparation procedure and contains the same preservation reagent concentrations in the final solution as in the sample solution used for analysis.
- H. Trip Blank: Usually an organic-free aqueous solution that is as free of analyte as possible and is transported to the sampling site and returned to the Sample Coordination Facility (SCF) without being opened. A trip blank is usually prepared by the SCF prior to the sampling event.

#### **4.0 BACKGROUND AND/OR CAUTIONS**

The majority of ER field efforts require the collection of samples for various quality control purposes. These include the isolation of site effects (control samples), definition of background (background sample), evaluation of field/laboratory methodology (duplicate samples), and assessment of the integrity of the sampling equipment (equipment rinsate blanks).

Sampling procedures outlined in the Sampling and Analysis Plans (SAPs) will be applied to QC samples in the same way they are applied to samples taken in the field. QC sample containers must be labeled and transported, and the samples analyzed in a manner identical to all other samples taken at a site.

#### **5.0 EQUIPMENT**

Equipment required for this procedure is only that specified by the Operable Unit (OU) Sampling and Analysis Plans.

#### **6.0 PROCEDURE**

The requirements for field QC samples will be evaluated as part of the OU-specific Sampling and Analysis Plan. QC sample requirements for radiological samples differ from those for nonradiological samples. Summaries of these requirements for radiological and nonradiological sampling are provided in Attachments A and B, respectively. The requirements are also provided in the Generic Quality Assurance Project Plan for Resource and Conservation Recovery Act (RCRA) Facility Investigation (LANL, 1991). In addition to the QC samples listed in these summaries, projects may require other types of samples be collected to obtain information concerning the sampling site (e.g., background and control samples). Determine the need for these samples during the preparation activities.

Obtain organic-free water in sealed containers appropriate for transport to the field and in sufficient quantity to prepare the required equipment (rinsate) blanks, field blanks, and reagent blanks. Organic-free water can be acquired at the Sample Coordination Facility (SCF).

Collect each type of QC sample required in the manner defined below.

See Attachment A for frequency of QC samples.

### **6.1 Background Sample**

Based on knowledge of the site and surrounding areas, identify areas and/or bodies of water that are similar to those being studied, but that are known or thought to be free of the contaminants of concern. Collect samples in the contaminate-free locations using the same sampling procedures used for samples from the site being studied.

### **6.2 Equipment (Rinsate) Blank**

After field cleaning the sampling equipment, rinse with organic-free water and collect the rinsate for analysis. Assure that all equipment surfaces that come in contact with the sampling materials are rinsed (e.g., the inside of a bailer).

### **6.3 Field Blank**

In the immediate vicinity of the sample collection activity, pour a quantity of organic-free water into designated sample containers. Follow the sample preservation procedure using the same preservatives and volumes as used with the other collected samples.

### **6.4 Field Duplicate (Replicate)**

At the frequency specified for the type of sample(s) being collected, collect two separate samples from the same source and at the same location and time. Place the samples in separate containers, follow the sample preservation procedure, mark each as a unique sample, and submit both samples for the same analyses.

### **6.5 Reagent Blank**

Pour a quantity of organic-free water that is free of the analyte(s) of interest into designated sample containers. Add to this container all preservation reagents, in the same concentration and volume, as those added to a sample.

## **6.6 Trip Blank**

Request that trip blanks be prepared by the SCF providing the sample containers for the sampling activities and that they be shipped with those containers. The number to be requested depends upon the number and type of samples to be collected. (See Attachments A and B for guidance.) Maintain the trip blanks with the sample containers throughout the sampling event and return them to the laboratory with the collected samples. Do NOT open the trip blanks.

## **7.0 REFERENCES**

The following procedures are directly associated with this procedure and should be reviewed before field operations:

LANL-ER-SOPs in Section 1.0, General Instructions

LANL (Los Alamos National Laboratory), May 1991. "Generic Quality Assurance Project Plan for RCRA Facility Investigations for the Los Alamos National Laboratory Environmental Restoration Program, Los Alamos, New Mexico (current version).

LANL (Los Alamos National Laboratory), November 1991. "Installation Work Plan for Environmental Restoration," Los Alamos, New Mexico (current version).

Sisk, S.W., 1981, "NEIC Manual for Ground Water Subsurface Investigations at Hazardous Waste Sites," EPA Office of Enforcement, National Enforcement Investigations Center, Denver, Colorado. (Sisk, 1981, \_\_\_\_\_)

## **8.0 RECORDS**

Records to be generated during sampling are listed in the applicable sampling procedures.

## **9.0 ATTACHMENTS**

- A. Quality Control Sample Summary for Radiological Samples
- B. Quality Control Sample Summary for Nonradiological Samples

**Quality Control Sample Summary for  
Radiological Samples<sup>a</sup>**

<b>QC Sample Type</b>	<b>Matrix of Samples</b>	<b>Frequency</b>	<b>Purpose</b>
Field Duplicate	Soil Water	1 per 20 samples 1 per 20 samples (or less)	To evaluate the reproducibility of the sampling technique.
Rinsate Blank	Water used to rinse equipment	1 per 20 samples <sup>b</sup> decontamination	To evaluate procedures.

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<sup>a</sup>Generic Quality Assurance Project Plan for RCRA Facility Investigations for the LANL ER Program, May 1991, Sections 5 and 10 (subject to annual update).

<sup>b</sup>Or 1 per shipment if less than 20 samples are collected in a day.

**Quality Control Sample Summary for  
Nonradiological Samples<sup>a</sup>**

<b>QC Sample Type</b>	<b>Matrix of Samples</b>	<b>Frequency</b>	<b>Purpose</b>
Field Blank	Soil Water	1 per 20 samples* 1 per 20 samples*	To determine reagent and field contamination from other than sampling matrix.
Reagent Blank	Water	1 per 20 samples*	To determine any contamination from preparation and processing of samples.
Field Duplicate (Replicate)	Soil Water	1 per 20 samples 1 per 10 samples	To evaluate the reproducibility of the sampling technique.
Rinsate Blank	Soil Water	1 per 20 samples* 1 per 10 samples**	To evaluate decontamination procedures.
Trip Blank	Water	1 per shipping container for VOA <sup>b</sup> analyses only.	To determine contamination during storage and transport.

<sup>a</sup>Generic Quality Assurance Project Plan for RCRA Facility Investigations for the LANL ER Program, May 1991, Section 5 (subject to annual update).

<sup>b</sup>VOA - Volatile Organic Compounds

\* or 1 per shipment if less than 20 samples are collected in a day.

\*\* or 1 per shipment if less than 10 samples are collected in a day.